National Aeronautics and Space Administration

POWERing the World:

NASA Data Predicting Worldwide Energy Resources

NASA supported RETScreen Software has been used for 20 wind energy projects built or under construction, totalling 100 Megawatts and an investment of $210 million. -- Courtesy of RETScreen International

The world is increasingly turning to renewable energy technologies for power

POWER provides monthly solar radiation averages to help design “green” buildings

Goals:

Establish partnerships to facilitate integration and adaptation of NASA satellite analysis and modeling data into electric power industry Decision Support Systems and databases.

Continually improve data sets for Electric Power, including renewable energy, energy efficient building design and biomass crop development Industries.

Transition operational capabilities to government and/or private sector entities.

Outcomes:

Solar and meteorological data developed under the POWER project fill the gap where measurements do not exist.

The renewable energy Web site has over 46,000 unique users in 160 countries.

Since June 1999, the SSE Web site has generated approximately 10 million hits and almost 2 million data downloads.

RETScreen International has 183, 000 users in 222 countries. More than one thousand new users every week.

POWER: Prediction of Worldwide Energy Resource

Using NASA Data to Improve Upon Current Surface and Meteorolgical and Solar Energy Data Sets and Models

Summary

Cities and countries around the world are recognizing the need for reduced dependency on traditional sources of energy and are turning to renewable energy technologies for power.

NASA has long supported satellite systems and research providing data for the study of climate and climate processes; data such as long-term estimates of surface solar energy (SSE) fluxes, ocean surface winds and surface temperature.

In the late 1990s, the Surface Meteorological and Solar Energy project was initiated through NASA's Applications program to provide Internet-based access to data specifically tailored to assist in the design of solar and wind powered renewable energy systems. The goal of the SSE-project was to make NASA's satellite data more readily accessible to the renewable energy community where such data was demonstrated to enhance the output of existing decision support systems.

Under the Applied Sciences Program, the Prediction of Worldwide Energy Resource (POWER) project has been initiated to improve the current SSE data set and to create new data sets from new satellite systems and forecast modeling data. The improved SSE data will continue to be focused on the solar and wind Renewable Energy industry.

The NASA POWER project is also contributing satellite-derived data for the preliminary design of "green" buildings and associated renewable-energy power systems, as well as satellite-derived solar and meteorological data supporting agrotechnology to help make agricultural production more efficient and sustainable.

Project Highlights

RETScreen (Renewable Energy Technology Screen) is one example of NASA data being used to support the renewable energy industry. RETScreen is a tool developed by Natural Resources Canada (NRCan) for renewable energy technologies analysis. Improvements to the software introduced in the past several years also estimate greenhouse gas emission savings relative to conventional systems. NASA Langley has been working with the NRCan team of government, industry and academic representatives on a consistent basis for more than ten years.

The RETScreen software can be applied to various clean power, heating and cooling technologies. It is used to evaluate existing or expected energy use, assess potential savings opportunities and then prepare a financial analysis for stand-alone measures or entire facilities as a system. The resulting analysis tells decision makers how much energy is produced by a wind turbine, a solar panel, a more efficient gas burner or a small capacity hydro plant. The analysis can also calculate what a renewable energy system will cost and estimate the return on investment for financing.

RETScreen has been put to use at the Vancouver International Airport to determine appropriate technology for solar water heaters. RETScreen software has been used by the Sustainable Energy Authority of Ireland to determine the value of investing in wind energy around the country.

The RETScreen software is one example of the international success story of the POWER program. The POWER Website has had more than ten million hits since its inception. Users such as architects, planners, investors and industry decision makers rely on NASA for their data to help change the way we power the world.

For more information about this project

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Value & Benefits

These data fill gaps where ground site data did not exist and supplements where it already existed

The software provides free data helpful for the implementation of renewable energy technologies

The program improves partnership efforts among a variety of government and nongovernmental industries

Key Web sites

Prediction of Worldwide Energy Resource
http://power.larc.nasa.gov

Surface Meteorology and Solar Energy
http://eosweb.larc.nasa.gov/sse/

NASA Applied Sciences Website
http://nasascience.nasa.gov/earth-science/applied-sciences